[0183] FIG. **49** illustrates an exemplary method for changing the topography of a user interface based on a location of a touch event according to embodiments of the invention. In the example of FIG. **49**, a determination can be made about whether an input has been received (**491**). The input can be from a user of a touch sensitive device. For example, the user can input a request to form a particular user interface. The input can also be a touch or near touch on the user interface surface. The input can also be from an application running on the device. For example, a telephone application running on the device can input a command to form a telephone user interface. The input can also be from the device itself. For example, upon powering up, a device can input a command to form a user interface for that particular device type.

[0184] Based on the input, a user interface state can be obtained for a user interface surface having a plurality of nodes with at least touch sensing and shape changeable capabilities (**493**). For example, if a user, an application, or a device inputs a request for a user interface surface that physically alters based on a location of a touch or near touch, the user interface state can be obtained, indicating that a user interface alterable by a touch event should be formed.

[0185] A determination can be made about whether a touch event has been detected (**495**). The touch event can be either a touch or a near touch on the user interface surface.

[0186] Upon detection of the touch event and its location on the user interface surface, the surface can physically alter at that location from a first physical layout to a second physical layout, where each layout can represent a mode of an electronic device (**497**). For example, as a touch or near touch occurs at a location on the surface, that location can raise or lower to form the second physical layout, depending on the needs of the device. As the touch or near touch moves away from the location, that location can return to its original position to form the first physical layout, depending on the needs of the device.

[0187] FIG. **50** illustrates an exemplary display device having a user interface that can change topography according to embodiments of the invention. In the example of FIG. **50**, display device **500** can include translucent stretchable membrane **503** disposed over display **502**, which can be in turn disposed on changeable nodes **501**, which can be activated to raise or lower the display.

[0188] FIG. **51** illustrates an exemplary display device having a user interface that can change topography by raising a display screen according to embodiments of the invention. In the example of FIG. **51**, changeable nodes **511** can be stimulated to raise display **512**. Upon raising, the display **512** can push against translucent stretchable membrane **513**, causing the membrane to stretch and thin out at section **513**-*a*. As the membrane thins out, it can become more transparent, making display **512** easier to view.

[0189] In some embodiments, the changeable nodes **501**, **511** can be electromechanical devices. In some embodiments, the changeable nodes can be shape changeable material. In some embodiments, the changeable nodes can be stimulated to a user interface state that can include display viewing. In some embodiments, the membrane can be somewhat opaque in its nominal state and translucent or transparent in its stretched state.

[0190] FIG. **52** illustrates an exemplary user interface that can change topography according to embodiments of the invention. In the example of FIG. **52**, user interface **520** can include shape changeable user interface surface **521** having transparent or semi transparent flexible outer membrane **523** and shape changeable nodes **522**, transparent or semi transparent touch sensing nodes **525**, and display nodes **526**. The flexible outer membrane **523** can form the touchable surface of the user interface of a touch sensitive device and can be expanded or retracted as the underlying shape changeable nodes **522** are altered, thereby changing the topography at the user interface surface **521**. The membrane **523** can be elastic, silicone, rubber, soft plastic, or any material that can stretch under force and return to normal when the force is removed.

[0191] The touch sensing nodes **525** can be disposed adjacent to the shape changeable nodes **522** on an undersurface of the membrane **523**, where the undersurface can be opposite the touchable surface. The touch sensing nodes **525** can detect a touch or near touch on the surface of the membrane **523**. As shown in FIG. **52**, the touch sensing nodes **525** can be positioned alternately with the shape changeable nodes **522**. Alternatively, the touch sensing nodes **525** can be positioned between every two or more shape changeable nodes **522** or vice versa, depending on the needs of the user interface **520**.

[0192] The display nodes **526** can be disposed adjacent to the shape changeable nodes **522** and the touch sensing nodes **525**. The display nodes **526** can display user interface elements viewable through the membrane **523**. As shown in FIG. **52**, the display nodes **526** can be aligned with the touch sensing nodes **525**. Alternatively, the display nodes **526** can be aligned with two or more touch sensing nodes **525** or vice versa and/or aligned with shape changeable nodes **522**, depending on the needs of the user interface **520**.

[0193] In some embodiments, the touch region and the shape changeable regions can substantially coincide. In some embodiments, the shape changeable regions can be positioned within the touch region, being either the same size as the touch region, smaller, or larger.

[0194] FIG. **53** illustrates an exemplary computing system that can include one or more of the embodiments of the invention described herein. In the example of FIG. **53**, computing system **530** can include one or more panel processors **531** and peripherals **532**, and panel subsystem **533**. Peripherals **532** can include, but are not limited to, random access memory (RAM) or other types of memory or storage, watchdog timers and the like. Panel subsystem **533** can include, but is not limited to, one or more sense channels **533**-*a,* channel scan logic (analog or digital) **533**-*b* and driver logic (analog or digital) **533**-*c*. Channel scan logic **533**-*b* can access RAM **533**-*f,* autonomously read data from sense channels **533**-*a* and provide control for the sense channels. In addition, channel scan logic **533**-*b* can control driver logic **533**-*c* to generate stimulation signals **533**-*d* at various phases that can be simultaneously applied to drive lines of touch sensor panel **534**. Panel subsystem **533** can operate at a low digital logic voltage level (e.g. 1.7 to 3.3V). Driver logic **533**-*c* can generate a supply voltage greater that the digital logic level supply voltages by cascading two charge storage devices, e.g., capacitors, together to form charge pump **533**-*e*. Charge pump **533**-*e* can be used to generate stimulation signals **533**-*d* that can have amplitudes of about twice the digital logic level supply voltages (e.g. 3.4 to 6.6V). Although FIG. **53** shows charge pump **533**-*e* separate from driver logic **533**-*c,* the charge pump can be part of the driver logic. In some embodiments, panel subsystem **533**, panel processor **531** and peripherals **532** can be integrated into a single application specific integrated circuit (ASIC).